EQ-731L

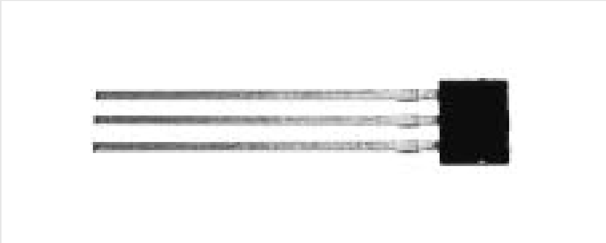
Shipped in bulk(500pcs/Pack)

EQ-731L is composed of an InAs Quantum Well Hall Element and a signal processing IC chip in a package

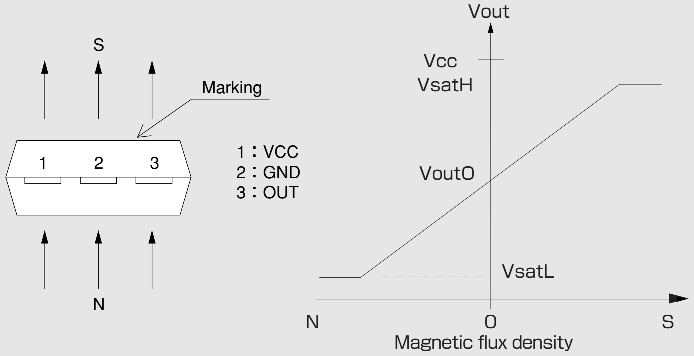
Notice:It is requested to read and accept "IMPORTANT NOTICE" written on the back of the front cover of this catalogue.

●Features

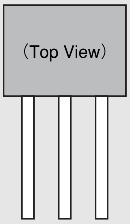
- Analog output which proportional to the magnetic field strength and pole.
- Magnetic sensitivity 65mV/mT(typ.)
- Supply voltage from 3.0V to 5.5V at single power supply
- Operating temperature range -40℃～100℃
- Ratio-metric analog output
- 3pin surface mount plastic package
- Quick response 1 μs
  (when the rise-up time of magnetic field is rather than 1μs)
- Low output noise voltage 5mVp-p



●Operational Characteristics

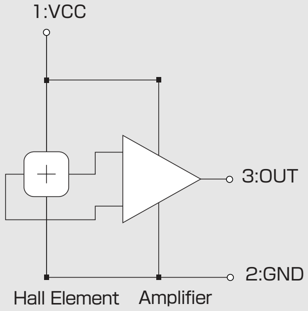


●Pin and functions

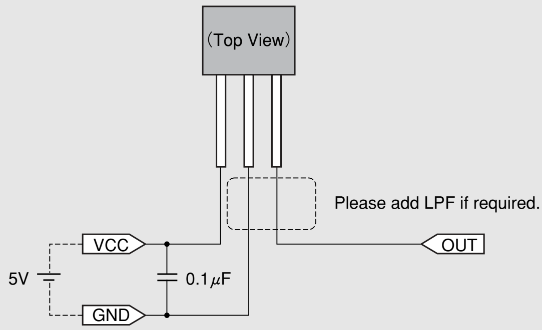


Pin No.	Pin name	Function
1	VCC	Power supply
2	GND	Ground
3	OUT	Output

●Functional Block Diagram



●Application Circuit



●Absolute Maximum Ratings (Ta=25℃)

parameter	symbol	specification	unit
Supply voltage	V_{CC}	−0.3 ～ 6	V
output current	Iout	±1.2(*)	mA
operating ambient temperature	Topr	−40 ～ 100	℃
Storage ambient temperature	Tstg	−40 ～ 125	℃

(*) Vcc=5V

●Recommend operating conditions

parameter	symbol	min	typ	max	unit
Supply voltage	Vcc	3.0	5.0	5.5	V
output current	IOUT	−1.0		1.0	mA
output load	CL			1000	pF

●Electric characteristics (T_A=25℃, V_{CC}=5V)

Parameter	Symbol	Conditions	min	Typ	Max	Unit
Current consumption	I_{CC}	B=0mT with no load		9	12	mA
Output saturation voltage at High Level(*1)	V_{SATH}	I_{OUT}=−1mA	V_{CC}−0.3		V_{CC}	V
Output saturation voltage at Low Level(*1)	V_{SATL}	I_{OUT}=1mA	0		0.3	V
Bandwidth(*2)	f_T	−3dB C_L=1000pF		210		kHz
Response time(*2)	t_{RES}	Rise time : 10% of Input MFD to 90% of output voltage. Fall time: 90% of Input MFD to 10% of output voltage. (under input/output MFD step is 1 to 2µs) C_L=1000pF		1		µs
Output rise time(*2)	t_{RISE}	10% to 90% of output voltage under input/output MFD step is 1 to 2µs. C_L=1000pF		2		µs
Output fall time(*2)	t_{FALL}	90% to 10% of output voltage under input/output MFD step is 1 to 2µs C_L=1000pF				
Output delay time(*2)	t_{REAC}	Rise time : 10% of Input MFD to 10% of output voltage. Fall time: 90% of Input MFD to 90% of output voltage. (under input/output MFD step is 1 to 2µs) C_L=1000pF		0.3		µs
Output noise voltage(*2)	V_{Np-p}			5		mVp-p

(*1&2) Design target at 25℃

※1mT = 10Gauss

●Magnetic characteristics (T_A=25℃, V_{CC}=5V)

Parameter	Symbol	Conditions	min	Typ	Max	Unit
Sensitivity(*3)	V_h	B=0、±22mT with no load	55	65	75	mV/mT
Quiescent voltage	V_{OUT0}	B=0mT	2.35	2.5	2.65	V
Linearity(*4)	ρ	B=0mT (I_{OUT}=0mA) B=±27mT (I_{OUT}=±1mA)	−0.5		0.5	%F.S.

(*3) See Characteristic Definitions section
(*4) See Characteristic Definitions section

※1mT = 10Gauss

●Ratio-metric characteristics (T_A=25℃)

Parameter	Symbol	Conditions	min	Typ	Max	Unit
Error in Ratiometric of Magnetic sensitivity(*5)	V_{h-R}	B=0、±22mT with no load	−3		3	%
Error in Ratiometric of Quiescent voltage(*5)	V_{OUT0-R}	B=0mT	−3		3	%

(*5) See Characteristic Definitions section

※1mT = 10Gauss

●Characteristic Definitions

①Magnetic sensitivity V_h (mV/mT)

Magnetic sensitivity is defined as the slope of the straight line obtained from three points, Quiescent voltage V_{OUT0}、V_{OUT} (+B)、V_{OUT} (−B) (B is described in measurement condition), by the least square approximation.

②Linearity ρ (%F.S.)

Linearity is defined as the ratio of a error voltage against FULLSCALE. Where error voltage is calculate as the difference from the straight line obtained from three points, Quiescent voltage V_{OUT0}、V_{OUT} (+B)、V_{OUT} (−B) (B and Output current are described in measurement condition shown below), by the least square approximation.

〈Condition〉:0mT applied、I_{OUT} = 0mA
+BmT applied : I_{OUT}=+1.0mA (Draw out from output)
−BmT applied : I_{OUT}=−1.0mA (Draw in to output)

$$\rho=\frac{V_{out}(B)-\{V_h\times B+V_{int}\}}{V_{out}(+B)-V_{out}(-B)}\times 100$$

Where FULLSCALE(F.S.) is defied as V_{OUT} (+B)、V_{OUT} (−B), Vint is y-intercepts of the line obtained in the Definition of Magnetic sensitivity.

③Error in Ratiometric of Magnetic sensitivity and Error in Ratiometric of quiescent voltage

Error in ratiometric is defined as the ratio of the variation of sensitivity and quiescent voltage at 3V and 5V as following equations..

$$V_{h-R}=\frac{\frac{V_h(V_{CC}=3V)}{V_h(V_{CC}=5V)}-\frac{3}{5}}{\frac{3}{5}}\times 100 \qquad V_{OUT0-R}=\frac{\frac{V_{OUT0}(V_{CC}=3V)}{V_{OUT0}(V_{CC}=5V)}-\frac{3}{5}}{\frac{3}{5}}\times 100$$

④Response time t_{RES} (µs)

Response time is defined as the time from the 90% reach point of input magnetic field rise up to the 90% reach point of output voltage rise up

⑤Output rise time, Output fall time t_{RISE}、t_{FALL} (µs)

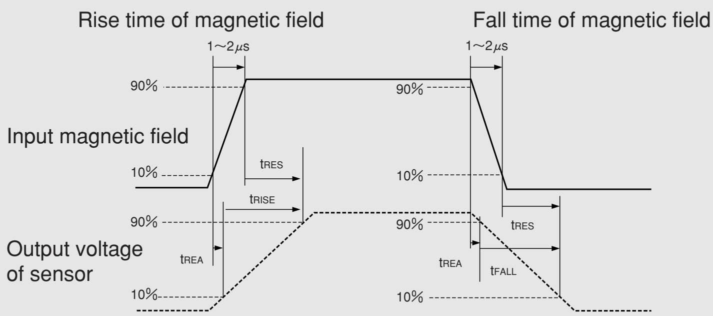
Output rise up time is defined as the time from the 10% point to the 90% point of output voltage under a pulse like magnetic field input shown below.

Output fall down time is defined as the time from the 90% point to the 10% point of output voltage under a pulse like magnetic field input shown below.

⑥Output delay time t_{REAC} (µs)

Output delay time is defined as the time from the 10% point in rise up(90% point in fall down) of input magnetic field to the 10% point in rise up(90% point in fall down) of output voltage under a pulse like magnetic field input shown below..

〈Relations of the input Magnetic field and t_{RES}、t_{RISE}、t_{FALL}、t_{REAC}〉



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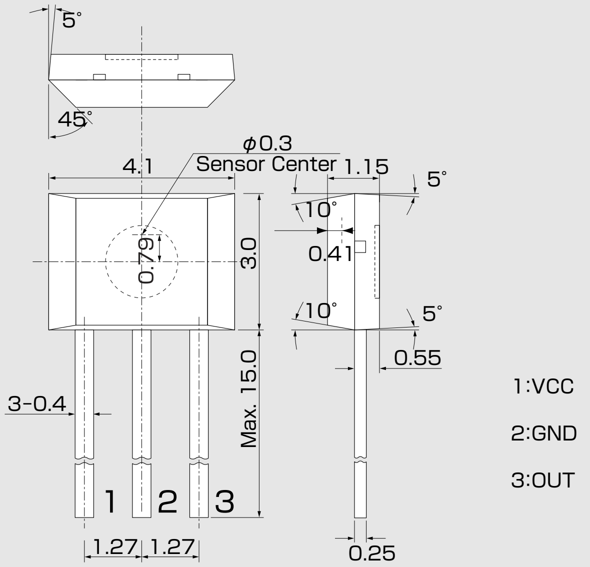
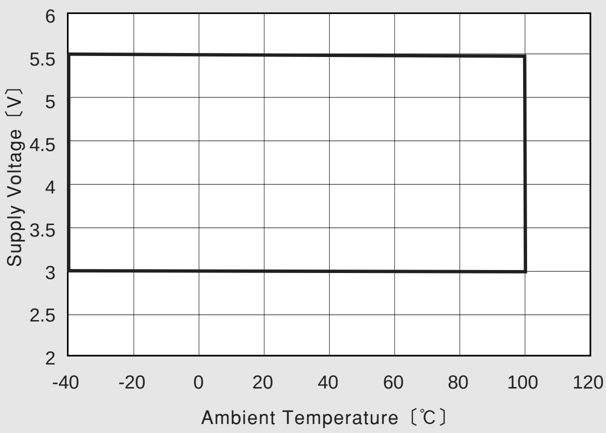
•This product contains galium arsenide(GaAs).Handling and discarding precsutions required.

●Package (Unit:mm)

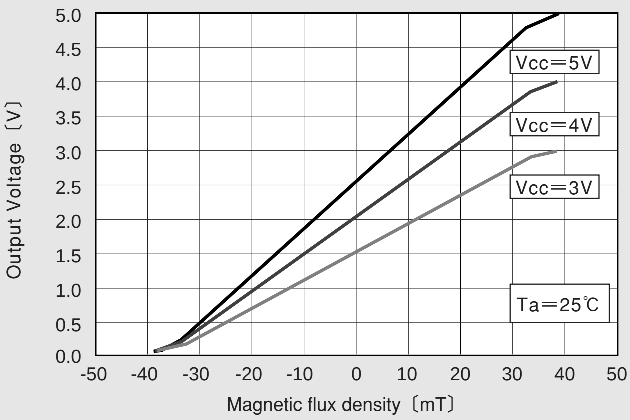


Note1) The sensor center is located within the φ0.3mm circle.
Note2) The metal portions on the package side (support lead) are connected to the internal circuits. The support lead should be isolate from the external circuit and the other support lead.

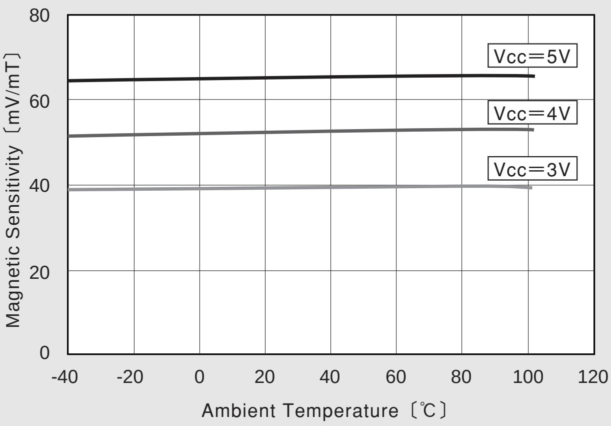
●Supply Voltage



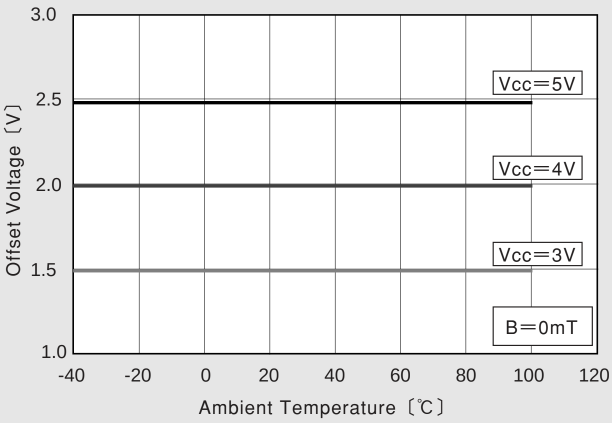
●Operational Characteristics



●Temperature dependence of VH



● (For reference only) Temperature dependence of Vout0



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June 14, 2012